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“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 8710 (1978): Electromagnetic Chucks [PGD 2: Machine Tool Elements and Holding Devices]

“ज्ञान से एक नये भारत का निर्माण”

Satyanaaranay Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartṛhari—Nītiśatakam

“Knowledge is such a treasure which cannot be stolen”



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AMENDMENT NO. 1 SEPTEMBER 1983
TO
IS:8710-1978 SPECIFICATION FOR ELECTROMAGNETIC CHUCKS

Alteration

(Page 3, clause 4.3) - Substitute the following for the existing clause:

'4.3 The chucks shall be leakproof against seepage of coolant and shall be free from defects, such as cracks, dents and scours.'

(EDC 11)

Reprography Unit, ISI, New Delhi, India

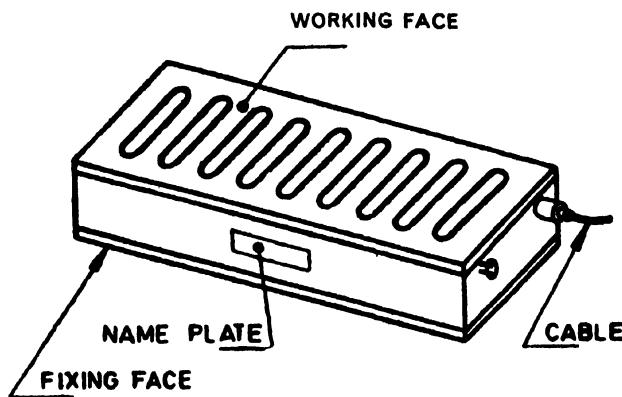
Indian Standard

SPECIFICATION FOR
ELECTROMAGNETIC CHUCKS

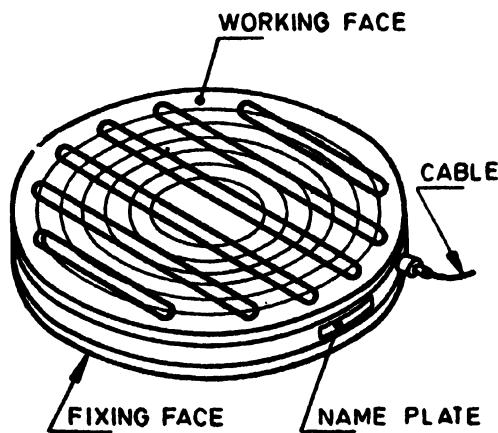
1. Scope — Covers the requirements for electromagnetic chucks, operated on dc supply only.

2. Nomenclature

2.1 Rectangular Electromagnetic Chucks



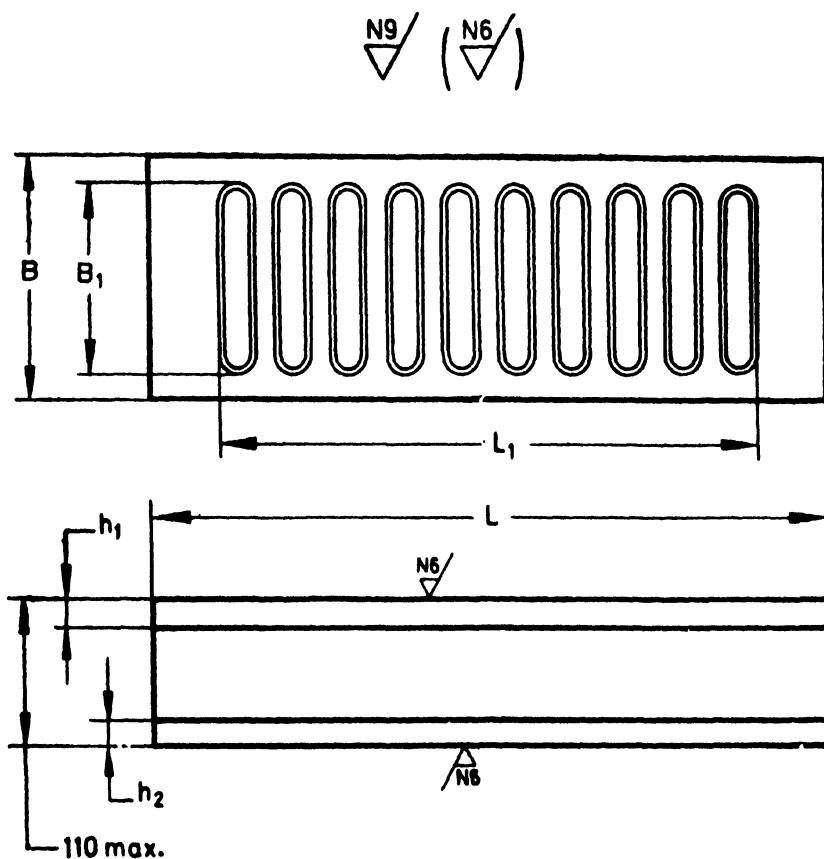
2.2 Circular Electromagnetic Chucks



Note — Figures are for guidance only and do not cover any design features.

3. Dimensions

3.1 Rectangular Electromagnetic Chucks



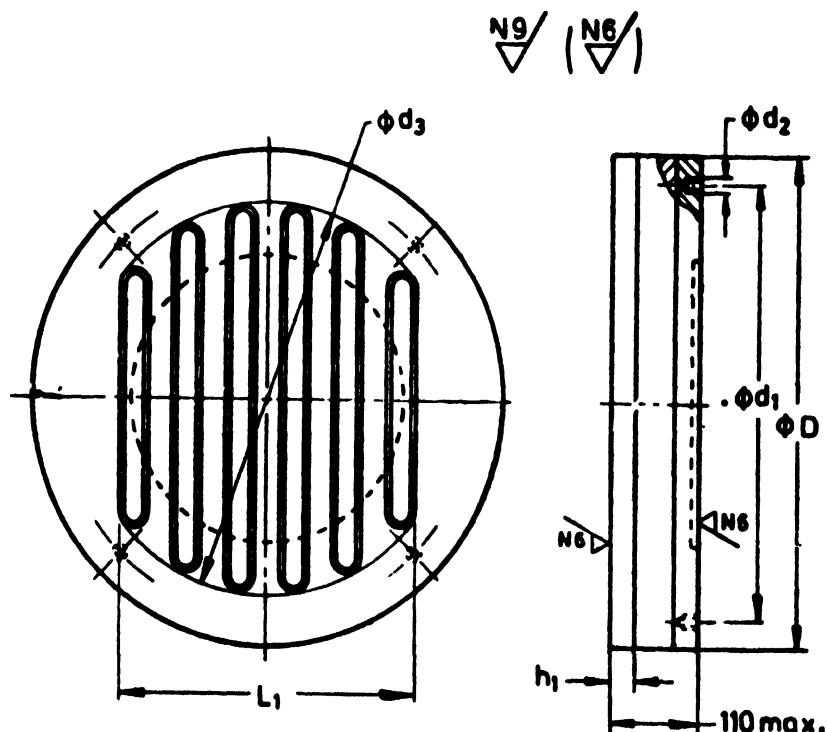
All dimensions in millimetres.

Nominal Size $B \times L$	B_1 Min	L_1 Min	h_1 Min	h_2 Approx
125 \times 250	100	180	16	16
150 \times 300	120	220	16	16
150 \times 450	120	360	18	16
200 \times 600	160	520	18	16
250 \times 1000	210	900	20	20
250 \times 1500	210	1400	20	20
300 \times 1000	250	900	20	20
300 \times 1500	250	1400	20	20

3.1.1 Designation — A rectangular electromagnetic chuck of nominal size 150 \times 300 mm shall be designated as:

Electromagnetic Chuck Rectangular 150 \times 300 IS : 8710

3.2 Circular Electromagnetic Chucks



All dimensions in millimetres.

Nominal Size D	d ₁	Tol on d ₁	d ₂	d ₃	L ₁ Min	h ₁ Min
100	83	± 0.25	M 8	70	50	12
160	140	± 0.30	M10	125	100	16
200	176	± 0.30	M10	160	125	18
250	224	± 0.35	M12	200	160	18
315	286	± 0.40	M16	250	200	20
400	362	± 0.40	M16	315	250	20

3.2.1 Designation — A circular electromagnetic chuck of nominal size 160 mm shall be designated as:

Electromagnetic Chuck Circular 160 IS : 8710

4. General Requirements

4.1 The fixing face and the working face of both circular and rectangular electromagnetic chucks shall be flat and the permissible error in flatness shall be 0.01 mm/300 mm in all directions (concave only). In case of chucks smaller than 300 mm in either length or diameter, as the case may be, the permissible error in flatness shall also be 0.01 mm on actual length or diameter of the chuck (concave surface only).

4.2 The working face and the fixing face shall be parallel within 0.04 mm/300 mm.

4.3 The chucks shall be leakproof and shall be free from defects, such as cracks, dents and scours.

4.4 The residual magnetism shall be such as to enable the job to be lifted out with the exertion of normal force when the chuck is in 'OFF' position.

4.5 The chucks shall be supplied with suitable flexible cable. The length of the cable shall be decided between the manufacturer and the purchaser.

4.6 The standard preferred voltages for the chucks shall be 110 or 220 volts dc.

4.7 The location and design of the junction box shall be such that it ensures 100 percent waterproofness.

4.8 A name plate shall be affixed on the chuck and shall provide the following details:

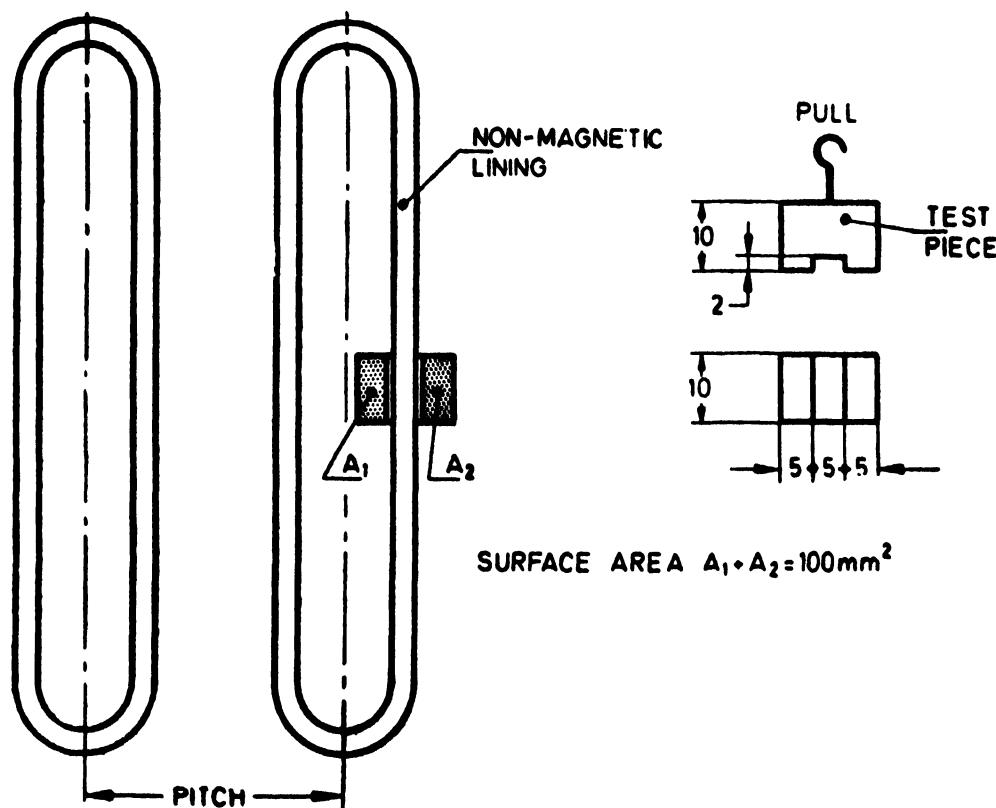
- a) Rated voltage in V,
- b) Rated current in A, and
- c) Demagnetizing voltage in V.

5. Tests

5.1 Slipping Force Test — For the purpose of this test, a test piece, made of low-carbon magnetic soft steel and having dimensions $75 \times 75 \times 40$ mm shall be used. One face having dimensions 75×75 mm of the test piece which is to be kept in contact with the working face of the electromagnetic chuck shall be smoothly ground. The test piece shall be placed near the middle of the working face of the electromagnetic chuck and shall be pulled by a spring balance in a direction parallel to the working face of the chuck. The test piece shall not slip at a force of 400 N indicated by the spring balance.

5.2 Vertical Pulling Force Test — For the purpose of this test, a test piece, made of low-carbon magnetic soft steel and having dimensions as shown in the figure below shall be used. The total area contact of this test piece shall form 100 mm^2 . The surfaces of the chuck which come in contact with the working face of the electromagnetic chuck shall be smoothly ground and cleaned from grease, oil and water and dried before use. The test piece should be kept exactly on the centre of the aluminium or separation line of each pole, so that the air gap of the test piece contact area is in touch with two poles of the working surface as shown in the figure. Then, by using a tension dynamometer, the test piece should be pulled perpendicular to the working surface of the chuck slowly without giving jerk or slip and the reading recorded in Newton force on the dynamometer at which the test piece pulls away from the working surface. This value shall be not less than 110 N.

All dimensions in millimetres.



5.3 Temperature-Rise Test — For the purpose of this test, the temperature of the top plate of the chuck (without energising the chuck) is measured. It should be ensured that the room temperature and the temperature of the top plate of chuck are same and the chuck is not mounted on any machine. The chuck is then energised for 8 hours under dry condition (without any coolant). At the end of 8 hours, the temperature of the top plate is measured. The difference between the initial and final temperature of the top plate is the rise in temperature. The rise in temperature shall not be more than 30°C.

5.4 Electrical Tests

5.4.1 Insulation resistance test — The insulation resistance measured with dc voltage of 500 V between power supply conductor and the earthed body shall not be less than 10 mega ohm.

5.4.2 High voltage test — This test should be performed after conducting the waterproofness test as described in 5.5 and drying the chuck completely. The chuck shall withstand a voltage of 1500 V for one minute between the power supply conductor and the earthed body, without breakdown of the insulation or flashover.

5.4.3 Resistance to earth terminal test — The resistance between the main earth terminal and the body of the chuck or the lifting handle shall not exceed 0.1 ohm.

5.4.4 Operating Test — The chuck shall be energised at the rated voltage and checked for its working by measuring the current and the power consumed.

5.4.5 Demagnetizing test — The chuck shall get demagnetized when a specified dc voltage is applied with reverse polarity (to that of normal operation voltage).

Note — The electrical tests given in 5.4.1 to 5.4.5 shall be conducted according to the methods prescribed in IS : 1356 (Part 1)-1972 'Specification for electrical equipment of machine tools: Part 1 Electrical equipment of machines for general use (second revision)'.

5.5 Waterproofness Test — For this test, first conduct insulation resistance test as given in 5.4.1. Then, immerse the chuck fully in a coolant tank and energise for 8 hours at the rated voltage. Remove the chuck from the coolant and repeat the insulation resistance test. The insulation resistance measured before and after immersion in coolant shall be the same.

6. Packing — The electromagnetic chucks shall be given a suitable rust prevention treatment at the time of despatch and shall be packed in accordance with the best prevalent trade practice.

7. Shipment — As the electromagnetic chucks are of composite construction, they are likely to warp during shipment, especially those of larger sizes. Due consideration shall be given for this warping.

8. Marking — The electromagnetic chuck shall be marked with the nominal size and the manufacturer's name or trade-mark.

8.1 ISI Certification Marking — Details available with the Indian Standards Institution.